IN THE CLAIMS:

Cancel claims 1, 2, 8, 9 13, and 14 without prejudice or admission and add new claims 15-29 as shown in the following listing of claims, which replaces all previous listings and versions of claims.

1. - 14. (canceled)

15. (new) An ion beam apparatus comprising:

a holder member that holds a sample by holding an end of the sample;

a focused ion beam unit that forms a cross section in a portion of the sample by irradiating a focused ion beam onto the sample from above and approximately orthogonally to a top surface of the sample held by the holder member; and

a removing beam unit that irradiates a gaseous ion beam onto the cross section of the sample held by the holder member and removes a fracture layer from the cross section, the gaseous ion beam being irradiated from the held end side of the sample so that its irradiating direction is tilted with respect to a normal to the cross section.

16. (new) An ion beam apparatus according to claim 15; wherein the gaseous ion beam is an inert gas ion beam.

17. (new) An ion beam apparatus according to claim 15; wherein the holder member comprises a base part which is rotatably supported about a first axis parallel with the horizontal direction, and a holding part which is rotatably disposed about a second axis, orthogonal to the first axis, at a tip end side of the base part and holds the sample where the focused ion beam is irradiated to form the cross section.

18. (new) An ion beam apparatus according to claim 17; further including a drive mechanism that rotates the holding part about the second axis.

19. (new) An ion beam apparatus according to claim 15; further comprising an observation beam unit that irradiates an electron beam onto the cross section of the sample to enable observation of the cross section.

20. (new) An ion beam apparatus comprising:

a holder member that holds a sample by holding an end of the sample;

a focused ion beam unit that forms a cross section in a portion of the sample by irradiating a focused ion beam onto the sample from vertically above the sample held by the holder member; and

a removing beam unit that irradiates a gaseous ion beam onto the cross section of the sample held by the holder

member and removes a fracture layer from the cross section, the removing beam unit being disposed so that the gaseous ion beam is irradiated from a lower slanting direction with respect to the held sample by the holder member.

21. (new) An ion beam apparatus according to claim 20; further including an observing beam unit disposed so as to irradiate an electron beam onto the sample held by the holder member from the horizontal direction.

22. (new) An ion beam apparatus according to claim 21; further comprising an observation beam unit that irradiates an electron beam onto the cross section of the sample to enable observation of the cross section.

23. (new) An ion beam processing method comprising:

a first step of holding a sample to be processed by holding the sample at an end thereof;

a second step of irradiating a focused ion beam onto the held sample from above to form a cross section in a portion of the sample; and

a third step of irradiating a gaseous ion beam onto the cross section of the sample and removing a fracture layer from the cross section, the gaseous ion beam being irradiated from the held end side of the sample so that its irradiating direction is tilted with respect to a normal to the cross section of the sample.

24. (new) An ion beam processing method according to claim 23; wherein the gaseous ion beam is an inert gas ion beam.

25. (new) An ion beam processing method according to claim 24; wherein in the third step, the irradiating direction of the inert gas ion beam is varied with respect to the sample.

26. (new) An ion beam processing method according to claim 25; wherein in the second step or the third step, the sample is moved with respect to the irradiating direction of the focused ion beam or the inert gas ion beam through a holder which holds the sample.

27. (new) An ion beam processing method according to claim 23; wherein in the third step, the irradiating direction of the gaseous ion beam is varied with respect to the sample.

28. (new) An ion beam processing method according to claim 27; wherein in the second step, the irradiating direction of the focused ion beam is varied with respect to the sample.

29. (new) An ion beam processing method according to claim 28; wherein in the second step or the third step, the sample is moved with respect to the irradiating direction of the focused ion beam or the gaseous ion beam through a holder which holds the sample.